

A  
DISSERTATION

ON THE SOURCE OF

*EPIDEMIC AND PESTILENTIAL*

DISEASES;

IN WHICH IS ATTEMPTED TO PROVE, BY A NUMEROUS  
INDUCTION OF FACTS, THAT THEY NEVER ARISE  
FROM CONTAGION, BUT ARE ALWAYS PRODUCED  
BY CERTAIN STATES, OR CERTAIN VICISSI-  
TUDES OF THE ATMOSPHERE.

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By CHARLES MACLEAN.

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CALCUTTA:

1797.

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" SCIENCE has much to deplore from the Multiplicity of  
" Diseases.—It is as repugnant to Truth in Medicine,  
" as Polytheism is to Truth in Religion. The Physician  
" who considers every different Affection of the different  
" Systems in the Body, or every Affection of different Parts  
" of the same System, as distinct Diseases, when they arise  
" from one Cause, resembles the Indian or African Sa-  
" vage, who considers Water, Dew, Ice, Frost and Snow,  
" as distinct Essences: while the Physician, who considers  
" the morbid Affections of every Part of the Body (how-  
" ever diversified they may be, in their Form or Degrees)  
" as derived from one Cause, resembles the Philosopher,  
" who considers Dew, Ice, Frost and Snow, as different  
" Modifications of Water, and as derived simply from the  
" Absence of Heat."

*See an Account of the Bilious Yellow Fever, By B. Rush, M. D. Page 29.*

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DISSERTATION  
ON THE SOURCE OF  
*EPIDEMIC AND PESTILENTIAL*  
DISEASES, &c.

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IN endeavouring to promote knowledge, it may sometimes be as useful to correct ancient errors as to promulgate new discoveries. In medicine, doctrines of the greatest importance have been handed down, from generation to generation, which, although demonstrably false, have never once been called in question. The supposed existence of contagion in plague, dysentery, and fevers, appears to me, to be a very remarkable instance of this propensity in man, to pursue the beaten tract, however unprofitable or unsafe. Is not this conduct often the effect of



selfishness, choosing to avoid the responsibility of innovation? And is it not for the same reason, that erroneous doctrines generally remain longer undisproved, in proportion to the extent of their influence upon practise? However that may be, it is certain that contagious matter has, in all ages, been considered, by the multitude, as the cause of plague, dysentery, and fevers,—by far the most destructive diseases that affect the human race. And this hypothesis, upon the belief of which must have depended, and may yet depend the lives of millions of our fellow creatures, seems to have been implicitly assented to, by every physician, from Hippocrates to the present day.

ALTHOUGH I had long entertained doubts upon this subject, it was not till very lately, that I was led to consider it, with particular attention. Upon perusing Dr. Rush's publication on the yellow fever, which desolated Philadelphia in 1793, all my former doubts recurred, with tenfold force; and the history of that epidemic, served to complete my conviction, *that no general disease, which affects a person more than once during life, can ever be communicated by contagion.* But as this term may be variously understood, it may not be improper to give a definition of it



in this place. Contagion, I conceive to be—a specific matter, generated in a person affected with disease, and capable of communicating that particular disease, with or without contact, to another.

WAS it a matter of mere idle speculation to inquire into the truth of this hypothesis, not less respectable from its antiquity than from the universality of its adoption, I should have been entirely silent. But the frequent recurrence and great mortality of epidemic and pestilential diseases, in many parts of the globe, render it an object of the most essential importance to ascertain, whether they are ever contagious. That they never arise from that source, I shall endeavour to prove, in the following manner:—

1st.—By shewing that consequences would necessarily result from the existence of contagion, in epidemic and pestilential diseases, which do not actually take place.

2dly.—By shewing that the existence of contagion has always been taken for granted in these diseases, not only without any proof, but even contrary to the evidence of numerous and convincing facts.

3dly.—By pointing out the real source of such epidemic and pestilential diseases, as have usually been reputed contagious; viz. a certain state or certain vicissitudes of the atmosphere, together with the casual application of other powers, producing indirect debility\*.

I.<sup>o</sup>—CONSEQUENCES would result from the existence of contagion, in epidemic and pestilential diseases, which do not actually take place.

If a person be affected with any contagious disease, it will necessarily be communicated to every other person, who comes within the infectious distance†, and is not at the time labouring under some disease higher in degree‡. But it is well known, to every one conversant in the subject, that in plague, dysentery, and fevers, a very small proportion only of those, who come within what may be supposed to be the infec-

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\* When any reference is made to general medical principles, in this Dissertation, they are understood to be those of the *Elementa Medicinæ Brunonis*, with the modifications of that doctrine, contained in the preceeding "View of the Science of Life."

† By infectious distance, I do not mean to express any definite space, but merely the distance at which contagion is supposed to act.

‡ Vide prop. VIII. View of the Science of Life.



rious distance, or even in contact with the sick, is seized with these diseases. In the most universal epidemic, it does not appear that a tenth part of the whole inhabitants of a city, has ever been, at one time, affected. But, let it be supposed, that every sixth person might have been seized; is it credible that the remaining five sixths were, either not within the infectious distance, or were, at the time, labouring under some disease higher in degree, than the prevailing epidemic? If it even be admitted that, in a terrible pestilence, one half of the inhabitants of a city may possibly be affected, the supposition that the other half could escape, if the disease was contagious, would be still more extravagant; for the greater the number affected, the less chance must any individual have, of being exempted from contagion. Allowing that one person in ten may not have been within the infectious distance; and that one in a hundred may have been labouring, at the time, under a more severe disease, than the prevailing epidemic; such is the exact proportion that would escape. The reverse, however, is probably true. But whatever may be the proportion of the number seized, to those that escape, it cannot be doubted that the application of the powers, which

produced the disease, in the person first affected, is adequate to produce the same effect, in all those, who are subsequently seized.

As the fact cannot be denied, that a great majority have escaped, after contact with persons ill of diseases supposed to be contagious, attempts may perhaps be made to account for it, by supposing a certain peculiarity of constitution, which exempts from, or disposes to disease. Is it the many, who escape, that have this happy peculiarity of constitution; or the few, who are seized, that are so unfortunate as to possess it? The former are evidently too numerous to admit of such an hypothesis. The property must, therefore, I conclude, be given to the latter. But a child, here and there, is exempted from small pox, although exposed to its contagion. In order to preserve a consistency, this fact must be accounted for, by the same, or another peculiarity of constitution. Peculiarities of constitution, then, exempt from contagion in one case, and dispose to it in another: and thus a term, which in reality means nothing, may be made to account for any thing. For my own part, I must confess my inability to comprehend any other *peculiarities of constitution*, or

*idiosyncrasies of habit* than what are constituted, by the different degrees of health and disease,—the different states of the excitability.

It appears, therefore, wholly unnecessary, for any purpose that I know, to suppose that, in epidemic and pestilential diseases, contagious matter is generated in those individuals who are first seized, and from them communicated to others; unless indeed, it be determined, at all events, to take the existence of such a power for granted.

It is a well known law of nature, that small pox, meazles, and other general diseases, which are unquestionably contagious, occur, in the same person, only once during life. It is also acknowledged by every author, who has written upon the subject, that plague, dysentery, and fevers affect the same person, as often as the powers which produce them are applied. Dr. Alexander Ruffel, affirms of the plague “the having had this distemper once, does not prevent the contracting it again. I have seen instances of the same person being infected three several times, in the same season.” A similar observation is made by Dr. Ruff, respecting the yellow fever of Philadelphia.



"Cases of reinfection," says he, "were very common during the prevalence of this fever."

SMALL-POX, measles, and other general diseases, which occur only once during life, never disappear, until the whole of those who have been within the infectious distance, and were not, at the time, labouring under some disease higher in degree, have received the infection. As these diseases are very mild\*, children sometimes resist the power of contagion, from the superior force of other diseases, although they may be so slight as to escape common observation. I will venture to assert that no person, in perfect health, ever was, or can be exposed to the power of contagion, without receiving the specific disease, which that contagion produces; excepting in small pox, measles, &c. when the person has previously the disease.

PLAGUE, dysentery, and fevers, then, as they are not subject to the same law, would, if they were contagious, never disappear. The contagion, meeting with no obstacle from other dis-

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\* They are not diseases of excessive excitement, but of indirect debility, and generally of a low degree.

eases, severer in degree (for there are few indeed of that description) would exercise an unlimited and fatal sway. No person could escape. Those, who once recovered would, again and again, be seized. Infection would proceed, in a continued circle, until the whole human race was extinguished.

2. THE existence of contagion in plague, dysentery, and fevers, has uniformly been taken for granted, not only without proof, but even contrary to the evidence of numerous and convincing facts.

It is well known, that, in hospitals, camps, and ships, a very small proportion only of those, who sleep within a short distance of, are frequently in conversation, or even in contact with, persons ill of typhus, dysentery, or fever, is seized with these diseases. So far from infection being invariably communicated in this manner, no instance of it has ever been distinctly traced. If such cases had even been recorded, we must either reject them as false, or abandon one of the fundamental axioms of philosophy. For, whatever has happened once, must happen often; it must happen always, in similar

circumstances. But in the situations alluded to, these circumstances constantly occur, and the alledged effects do not follow. It is not fair to conclude, that dysentery is contagious, because one person happens to be taken ill, while in the neighbourhood of another, who has got the disease. If the conclusion was just, all within the infectious distance, not labouring under a disease higher in degree, would be similarly affected. They would have the disease with as much equality of force, as children have the small-pox. In proportion to the number affected, the power of contagion would increase. It would proceed in a geometrical ratio, diverging, from the center, to every point of the circumference, of a city, a camp, an hospital, or a ship. It is evident then, that in these situations, a contagion, which had the power of producing its peculiar disease, in the same person, more than once during life, would never disappear. But dysentery, fevers, and the plague itself cease, in all those situations, without having affected perhaps a tenth part of the community. They cease too, when they are epidemic, according to some periodical law, which evinces that they do not arise from any casual and uncertain source,



like the accidental application of contagious matter.

THE absurdity of the conclusions, which result from admitting contagious matter to be the cause of epidemic and pestilential diseases, could not have been overlooked till now, if the existence of such a source had not been so implicitly taken for granted, that even to call in question the truth of it, must, to many, have the appearance of excessive scepticism. But I shall endeavour to deduce my conclusions, from such numerous and undoubted facts, as ought, perhaps, to exempt me from that imputation.

DURING the prevalence of epidemic and pestilential diseases, it is well known, that nurses, and other attendants upon the sick, are not more liable to be affected than other people, who undergo an equal degree of fatigue. It may perhaps, be said, that they become habituated to the contagion. But how do they escape the first application of it? They have not then got the habit. No person of that description caught the infection from those who died, of what was called the jail fever at the

black affizes at Oxford; a case of alledged contagion so generally known, and so frequently quoted by authors. That the power, which occasioned disease at the Oxford affizes, was not contagious matter, is proved by its producing diarrhœa in some, while it produced fevers in others. And further, no person was seized, who had not been directly exposed to the influence of the noxious air. Specific contagion, I conceive, cannot produce a disease, less uniform in its appearance, than small-pox and measles. But every epidemic and pestilential disease, which has hitherto been reputed contagious, assumes such various and dissimilar appearances in different persons, that they cannot be the effect of any power, equal and uniform in its operation. The symptoms are not, in any two persons, exactly alike. Hence the difference of opinion among the physicians of Philadelphia, during their late epidemic; some asserting that every disease had resolved itself into yellow fever, while others, certainly with more reason, affirmed that the diseases of the city were various. No epidemic can become so general, as to suppress all other diseases; because all men, labouring under diseases of lower degree, are not exposed to the powers

which produce an epidemic. The same person indeed cannot, at the same time, have both a dysentery and a dropſy\*; but every uſual variety of diſeaſe may exiſt in a community, even in the time of a powerful epidemic, altho' the epidemic be the moſt general diſorder. The diſſimilarity of ſymptoms, which occaſioned this difference of opinion at Philadelphia, is, to me, a convincing proof, were there not many others, that the yellow fever of that city, did not ariſe from any power, of ſuch uniform operation, as contagious matter. Like wine, opium, or mercury, ſpecific contagion muſt produce ſimilar effects, upon all men, who are ſimilarly ſituated. It muſt act alike in Egypt and in America, in London and in Conſtantinople. But, according to all accounts, the ſymptoms of epidemic diſeaſes, in different parts of the world, are very diſſimilar; while thoſe of diſeaſes that are undoubtedly contagious, ſuch as ſmall-pox, meazles, lues venerea, &c. are the ſame in all. Wine will intoxicate, cathartics will purge, mercury will ſalivate in all countries. They will produce theſe effects, upon almoſt all men; certainly upon all men who are in health.

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\* It is only meant, in as far as they are general diſeaſes; for, the local affections, which have obtained theſe names, as they occur in different parts of the body, may readily co-exiſt.



Those only, who are in a state of disease, higher in degree than these powers can produce, will resist their operation\*. But this proportion cannot be one in a thousand, perhaps not one in ten thousand. Such also may be the proportion that would escape, from the effects of a specific contagion, applied to them. It is common, however, for men in health, to be exposed to contact with the sick, and to escape. In that case, contagion, if the disease had been contagious, must inevitably have been applied; and without producing its imputed effects.

Was not the typhus fever, by which so many of the unfortunate people, who were imprisoned in the black hole of Calcutta, perished, attended with an endless variety of symptoms? It does not appear that the disease was, in that case, communicated to any person, who had not breathed the polluted air of the dungeon. Will it be said, that the Nabob Surajeddoullah had previously ordered contagious matter to be inserted

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\* It is impossible, with the greatest quantity of mercury that has ever been given, to salivate a person, whose liver is in a state of supuration. No quantity of wine will intoxicate a person, ill of typhus fever, without having first cured the disease.

into the black hole? If not, whence was it imported, or where generated?

IN the history of these diseases, I think it may be remarked, that physicians have been peculiarly exempted from their influence. Is it that there is a principle of repulsion between medical skill and contagion? or is it not rather for this plain reason, that these diseases depend upon some other power, which the physician is better able to avoid? For, will any reasonable person assert, that a medical practitioner (unless the structure of his body be supposed different from that of other people) can visit a patient ten or twelve times, feel his pulse, and converse with him, without receiving the infection, if the disease of the patient be contagious, and the practitioner has not, at the time, a disease of higher degree? Physicians, in perfect health, have attended as many patients, ill of diseases hitherto reputed contagious, as they could visit in the day; and yet have escaped. But it is as absurd to believe, that a person can be exposed to the influence of any power, capable of producing plague, dysentery, or fever, without being affected, as that a large quantity of

spirituous liquors, or stimuli, still more diffusible, can be applied to living bodies, without producing a correspondent effect. If it be at all admitted, that contagion is the cause of these diseases; it must also be admitted, that contagion, as in this case, may sometimes be applied, without producing its effect,—which is impossible.

ANOTHER fact worthy of notice is, that aged persons and children, are both seldomer and less severely attacked by epidemic and pestilential diseases, than the young and middle aged; and women seldomer and less severely than men. Now, if contagion was the source of these diseases, the case would be exactly reversed. Old people, women, and children, being more in the way of contagion, would be more frequently and more severely attacked. But the young and middle aged, being more exposed to the vicissitudes of the atmosphere,—the principal source, as I shall afterwards endeavour to shew, of those diseases,—than aged persons and children, and men more than women, they are consequently more frequently and more severely attacked. It has been a puzzling question to solve, “ why old people



“ and children have been less obnoxious to  
 “ plague, dysentery, and fevers, than the young  
 “ and middle aged ; and women less than  
 “ men ? ” But the solution will no longer be  
 difficult, if it should be proved that these diseases  
 never arise from contagion, but are always pro-  
 duced by certain states or certain vicissitudes of  
 the atmosphere, together with the application of  
 other powers, co-operating in the production of  
 indirect debility. For, it is evident that, to the  
 influence of these states, or vicissitudes, and of  
 these powers, the young and middle aged are  
 always more exposed than old people and chil-  
 dren ; and men more than women.

LET a person, in the height of a pestilential dis-  
 ease, be removed from the atmosphere which oc-  
 casioned it, into one more pure, he will commu-  
 nicate the infection to no one. “ It has been  
 “ remarked,” says Dr. Rush, speaking of the  
 yellow fever of Philadelphia “ that this fever did  
 “ not spread in the country, when carried there  
 “ by persons who were infected, and afterwards  
 “ died with it.” In another place he observes,  
 “ during four times that it occurred in Charle-  
 “ ston, in no one instance, according to Dr. Li-  
 “ ning, was it propagated in any other part of

“ the state.” \* Convincing proofs these, that the disease did not depend upon contagion, but upon the state of the atmosphere at Philadelphia in the one case, and at Charleston in the other. The various ways in which the College of Physicians of Philadelphia and Dr. Rush attempted to account for the origin of the contagion, which they supposed had produced the yellow fever of 1793, shews into what inconsistencies the most sensible men may be betrayed, when they attempt to reason upon false data. Having all taken the *existence* of contagion for granted, they only differed with respect to the *origin* of it. The College was of opinion, that it was *imported*; Dr. Rush affirmed, that it was *generated* in the city. A better description cannot be given of the several hypotheses, which distracted the faculty, upon this occasion, than in his own words, “ public report had derived it” (the contagion) “ from several different Islands; had chafed it from ship to ship, and “ from shore to shore; and finally conveyed it, “ at different times, into the city, alternately “ by dead and living bodies; and from these

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\* Vide an account of the bilious, remitting, yellow fever, of Philadelphia, by B. Rush, M. D. page 157.

"tales, all of which, when investigated, were  
 "proved to be without foundation, the college  
 "of physicians composed their letter\*. It  
 "would seem, from this conduct of the college,  
 "as if medical superstition had changed its  
 "names, and that in accounting for the origin  
 "of pestilential fevers, celestial, planetary, and  
 "demoniacal influence, had only yielded to the  
 "term—*importation*†." But it does not appear  
 that Dr. Rush, in his attempts to trace the  
 origin of the contagion, was more successful  
 than the college. He supposed it to arise from  
 putrid, vegetable exhalation, produced by a heap  
 of damaged coffee, lying on a wharf. But the  
 progress of the disease was not traced, with any  
 certainty, to that focus. It is evident, indeed,  
 from Dr. Rush's own account, that the inhabi-  
 tants of other streets had been as early and as  
 generally affected, as those of the streets in the  
 immediate neighbourhood of the coffee.

IN this, and every other case of epidemic and  
 pestilential disease, the existence of contagion  
 would seem to have been uniformly taken for

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\* Containing their opinion respecting the origin and treatment of the Yellow Fever. Vide Rush, page 21.

† Vide an Account of the Yellow Fever, page 164.



granted, not only without examination, but even contrary to the evidence of numerous facts—a conduct certainly not less unphilosophical in medicine, than in any other department of science.

3 —CERTAIN states, or vicissitudes of the atmosphere, together with the application of other powers, producing indirect debility, are the cause of all epidemic and pestilential diseases, which affect the same person more than once during life, and have hitherto been reputed contagious.

EVERY country has its unhealthy season, corresponding with some particular period of the year, at which the diseases, peculiar to that country, are more general and severe than at other times. This is observed to happen, in those months most remarkable for heat, calm weather, or sudden vicissitudes of the atmosphere; and they are nearly the same in all parts of the world. In Europe, Asia, Africa and America, from July to October, with little variation, includes the most unhealthy portion of the year. In some places indeed, as Aleppo, that happens from April to July; but always with a certain regularity, coinciding with periodi-

cal states of the weather. The diseases, which annually arise from this source, are not always general or severe. It is only when the heat, calm weather, or vicissitudes of the atmosphere, have been uncommon, that the ordinary diseases of the season arise to a degree, which constitutes epidemic and pestilential diseases.

FROM every record of epidemic and pestilential diseases, it would appear, that they have their stated periods of recurrence; that these periods are such months, as are most remarkable for vicissitudes of the atmosphere; that they become general, only in years in which these vicissitudes are extreme; that they do not occur in seasons when the degrees of heat or cold, however intense, are equable; nor in years when the state of the atmosphere remains tempered throughout; and that they uniformly cease, with the establishment of an equable state of the atmosphere, whether the weather be hot or cold.

THE yellow fever in America “appeared  
“ six different times about the 1st or middle of  
“ August, and declined or ceased about the  
“ middle of October—viz. in 1732, 1739,

" 1745, and 1748 in Charleston; in 1791  
" in New York; and 1793 in Philadelphia."\*  
In 1793, the yellow fever appeared also in  
different parts of the West Indies†. At-  
tempts were made, in the Islands, to trace the  
contagion to the continent. On the continent  
it was traced back to the Islands. But why  
should we hesitate to believe, that the same ge-  
neral causes which produced unusual vicissitudes  
of the atmosphere, in the one country, should  
extend their influence to the other? In the same  
year, and the same season, the English settlers,  
on the coast of Africa, were seized with a fever,  
which proved fatal to a great number of them.  
It happened, at this period, that a ship arrived  
from Boullam, on the coast of Africa, at Grenada,  
in the West Indies. And hence the contagion  
was supposed, by Dr. Chisholm and others,  
to have been imported in that ship. Was it  
necessary, it might easily be shewn, that these  
suppositions were adopted upon very slight  
grounds. But if the existence of contagion can  
be disproved upon general grounds, it would be  
superfluous to investigate every particular cir-

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\* Rush on the Yellow Fever.

† Vide Chisholm on the Malignant, Pestilential Fever, &c.



cumstance in its favour, that may have been hastily assumed as a fact.

IN Aleppo, according to Dr. Russell, the European inhabitants regularly shut themselves up, in their houses, every year, at some period between April and July. And the rich natives begin to adopt the same plan, as far as their customs will permit them to do, without scandal. From this fact, it appears that the plague occurs at Aleppo, in a state less or more mild, almost annually, and *that it commences and ceases at certain known periods*. But it has been remarked there that, in its most severe state, this disease recurs only at periods of ten years, or thereabouts—a regularity, which cannot, upon any known principle, be attributed to a power of such casual application, as contagious matter.

It has farther been observed of the plague, that “the winter puts an end to it at Constantinople;” “the summer destroys it in Egypt.” In fact, what epidemic or pestilential disease has been known to occur with severity at these periods of the year? But, in order to account for this, will it be said, that contagion is destroyed, both by heat and by cold? The assertion would certain-

"1745, and 1748 in Charleston; in 1791 in New York; and 1793 in Philadelphia."\* In 1793, the yellow fever appeared also in different parts of the West Indies†. Attempts were made, in the Islands, to trace the contagion to the continent. On the continent it was traced back to the Islands. But why should we hesitate to believe, that the same general causes which produced unusual vicissitudes of the atmosphere, in the one country, should extend their influence to the other? In the same year, and the same season, the English settlers, on the coast of Africa, were seized with a fever, which proved fatal to a great number of them. It happened, at this period, that a ship arrived from Boullam, on the coast of Africa, at Grenada, in the West Indies. And hence the contagion was supposed, by Dr. Chisholm and others, to have been imported in that ship. Was it necessary, it might easily be shewn, that these suppositions were adopted upon very slight grounds. But if the existence of contagion can be disproved upon general grounds, it would be superfluous to investigate every particular cir-

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ly be absurd. Besides the fact can be much better explained. At these periods, the body is not so liable to disease, because it is not exposed to the effects of heat and cold, dryness and moisture, tempestuous and calm weather, suddenly and frequently alternated. These vicissitudes are most remarkable in spring and autumn, which accordingly are the seasons, most fertile of diseases, in all parts of the globe. It is a curious circumstance, and much to our present purpose, that the belief of the Turks in the contagious nature of the plague, has considerably increased, since their communication with Europeans has become more extended. Formerly there was no want of servants, or relations, to undertake every necessary office about the sick, the same as in any common distemper; but now, it is difficult to procure even mercenary attendants. "I have met," says Dr. Russell, speaking of the plague at Aleppo in 1760, "with several instances, even in Turkish houses, "where the mistress of the family was not only "ill attended, but even abandoned through the "timidity of her daughters and slaves. I apprehend the dread of contagion gains ground "among the Mahommedans, in all parts of "Syria, where the Europeans have much com-

"merce." Mahommed, having probably perceived the bad consequences that would result from such a dread, condemned the belief of diseases being spread by contagion, as *impious*. And this at least shews, that the plague has not always been supposed, by the Turks, to arise from contagion; or if it has, that the belief was deemed injurious. With the example of European credulity before them, the modern followers of Mahommed may, in no long time, put more faith in contagion, than in this law of their prophet. But in such a renunciation of faith, even a Christian will have little cause to rejoice. If it should appear to be only a substitution of one error for another, Europeans will not have much reason to ridicule the former stupidity of the Turks; nor to boast of their own superior penetration, in introducing among them a belief in the contagious nature of pestilential diseases.

PHYSICIANS, having observed the dependence of epidemic diseases upon the state of the atmosphere, their uniform appearance under some states, and cessation under others, could not well reconcile these facts with the hypothesis of contagion. But a reconciliation was, at all events, determined upon. The state of the atmosphere was made to act upon the matter of

contagion, in such a manner as to explain every phenomenon. Is the weather hot, when an epidemic commences, heat gives activity to contagion; is it cold, cold is favourable to contagion; is it dry, the contagion is concentrated; is it wet, diluted: even vicissitudes set it in motion. But should the epidemic happen to cease, during any of these states of the atmosphere, this may with equal facility be accounted for, by assigning to the *same* powers, as has frequently been done in medical reasoning, *different* or even *opposite* modes of operation. Let the existence of contagion be once admitted as a fact, and there is nothing more easy than to trace its origin to some ideal source. The most obvious, and therefore the most frequently insisted upon, is contact with some person, ill of the same disease. But as the person, who happens to be first seized, could not have received the infection in that manner, it was found necessary to refer it to various sources. Even with those advantages, however, it was often difficult, and exercised the ingenuity of the learned, to discover the origin of particular epidemics. The imputed sources of those calamities became at length so numerous, that it now requires little labour to trace the origin of all diseases to



some one, or other of them. If, for instance, it cannot be traced to actual contact, it will probably be discovered, that the patient has, at some recent period, been exposed to the effluvia of rotten hemp, flax, coffee, cabbage, onions, black pepper, or potatoes; for all of these powers have been said to produce epidemics. But in years, when these diseases are so highly pestilential, that the effluvia, arising from a heap of rotten vegetables, might seem too trifling a power to produce such important effects, recourse may still be had to the importation of contagious matter, in bales of goods from the Mediterranean; or, with the ingenious Gibbon, to the generation of it, by swarms of putrid locusts, in Egypt. These hypotheses, were they not supported by the authority of celebrated names, are almost too ridiculous for refutation. That a parcel of rotten vegetables should produce a disease, that is contagious, and capable of producing desolation and death, over a populous city, ought not certainly to be credited without proof; and with respect to proof, it does not appear that there is any, excepting that, during the prevalence of epidemics, vegetables have become putrid. Was putrid vegetable exhalation ever the cause of a

contagious disease, it would spread in an evident and regular progression, affecting first those who are nearest to its source. There could be no possibility of mistaking or overlooking the cause. But as no such progress has ever been ascertained, and as it might have easily been traced, had there been any truth in the opinion, it is every way inconsistent with just reasoning to admit, that putrid vegetable exhalation can be the cause of contagion.—I mean not to deny, that putrid vegetable exhalation may produce disease; but the disease will not be contagious. There cannot be a doubt that putrid vegetable exhalation is a power, capable of producing disease, in its immediate neighbourhood; but it is equally certain, that it never can occasion an epidemic or pestilential disease, over a whole country, or city. The putridity of vegetables, and the epidemic diseases of animals, are probably occasioned by the same power, viz. a certain state or certain vicissitudes of the atmosphere. That kind of weather, or that disposition of the surrounding elements, which occasions an uncommon mortality among animals and vegetables, will also produce an uncommon degree of putrefaction, among these substances, in their dead state.

COULD the history of all epidemic and pestilential diseases of animals be minutely traced, I am well convinced it would be found, that they have uniformly been attended with correspondent diseases of vegetables, in that particular part of a country, to which they have been confined. For, as all living bodies are subject to the same laws,\* it is evident that any power, which can produce general disease in animals, will have the same effect upon that portion of vegetable substances to which it is applied; and *vice versa*. † Accordingly those diseases of indirect debility of vegetables, known to farmers by the terms *rust* and *blast*, have often been observed to occur, at the same time with epidemic diseases among animals. And the reason why such a coincidence has not always been expressly noticed, is probably, that the subject has not been considered in this point of view. If such a coincidence then should be found invariably true, will it be said that contagion may be communicated from animals to vegetables, and from vegetables to animals?

+ It should be recollected that Vegetable Life is supported upon Air, & is soon destroyed by Animal Life &c

\* Vide prop. I. View of the Science of Life.

Secrete from the external Surface of its Foliage that part of an air / Oxygen / <sup>an effete & dead</sup> without which the Vital actions of Animals could not be kept up.



WHEN particular districts of a country, whole nations, or considerable portions of a continent, are suffering from a scarcity of grain, will it be said that the disease of vegetables, which is the cause of the scarcity, was produced, not by the state of the atmosphere, but by contagion? In this case, how is the contagious matter to be traced? Is it wafted, as it were by a magic influence, from field to field,—over mountains, rivers, lakes, and oceans? The infectious distance would, in that case, be wide indeed! But I apprehend it will scarcely be contended, that the epidemic diseases of vegetables are contagious. And in regard to animals, the opinion does not appear at all more probable; excepting from the single circumstance of their not being rooted to the soil. Would it not be more rational to admit, that the diseases, in both cases, are produced by the operation of some such general power as the states or vicissitudes of the atmosphere, to the influence of which animals and vegetables are equally exposed?

Of the numerous facts, by which this proposition is supported, it will suffice to quote a few. As Dr. Rush's account of the yellow fever of Philadelphia is, perhaps, the best his-

tory that has been given of any epidemic, it may be often with propriety referred to. "There was something in the heat and drought of the summer months," (1793) "which was uncommon, in their influence upon the human body. Labourers every where gave out, (to use the common phrase) in harvest, and frequently too when the mercury in Fahrenheit's Thermometer was under 84\*\*\*\*\*. The crops of grain and grass were impaired by the droughts."

It appears, from several observations, that there was, that year, an uncommon calmness of the weather.

"In the year 1762, the bilious yellow fever prevailed in Philadelphia, after a very hot summer, and spread like a plague, carrying off daily, for some time, upwards of twenty persons." Can it be doubted, that these states of the weather will produce disease, both among animals and vegetables? And if the operation of such an obvious power, be adequate to explain the phenomena of pestilential diseases, what need is there of adopting an ideal one, like contagious matter, to account for them?

MR. Potter, in a letter to Dr. Rush, dated from Caroline, county Maryland, 1st November, 1793, says, "it is an invariable maxim here, both among physicians and farmers, that, if the wheat be damaged by rust or blast, a contagious dysentery is soon to follow."\*

PREVIOUS to the occurrence of every epidemic, something unusual, in the state of the atmosphere, has always been remarked. A yellow fever appeared at Cadiz, after a hot and dry summer in 1764; and at Pensacola, in similar circumstances, in 1765. Was the contagion traced, in this case, from Cadiz to Pensacola, by a direct or circuitous channel, or was it traced at all?—That the yellow fever of Philadelphia, in 1793, depended upon the states or vicissitudes of the atmosphere, evidently appears from the following observations, communicated to Dr. Rush, by a gentleman, who resided occasionally in southern and tropical countries. He informed him, "that he had observed, in the month of July, several weeks before the yellow fever became general, a peculiar and universal fallowness of complexion, in the faces of the citizens of Philadelphia, such as he had observed to precede the prevalence of malignant bilious fevers,

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\* Page 181.



" in hot climates." Dr. Dick had observed  
 " the same appearance in the faces of people in  
 " Alexandria, accompanied in some cases, by a  
 " yellowness in the eyes, during the last sum-  
 " mer," (1793) " and some time before violent,  
 " bilious fevers became epidemic, upon the  
 " banks of the Potowmac."\* A change so  
 gradual and general in the appearance, both  
 of animals and vegetables, can never be  
 explained by admitting contagion, but is easily  
 and satisfactorily accounted for, by suppo-  
 sing the states or vicissitudes of the atmosphere  
 to have been the noxious power. " It appears  
 " farther, from the register of the weather, that  
 " there was no rain between the 25th of August,  
 " and the 15th of October, except a few drops,  
 " hardly enough to lay the dust of the streets,  
 " on the 9th of September, and the 12th of  
 " October. In consequence of this drought,  
 " the springs and wells failed in many parts of  
 " the country. The dust, in some places, ex-  
 " tended two feet above the surface of the  
 " ground. The pastures were deficient or  
 " burnt up. There was a scarcity of autum-  
 " nal fruits in the neighbourhood of the

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\* Vide Rush, page 183.

“ city. But while vegetation drooped or died,  
“ from the want of moisture in some places, it  
“ revived with preternatural vigor, from unusu-  
“ al heat, in others. Cherry trees blossomed,  
“ and apple, pear, and plumb trees bore young  
“ fruit, in several gardens in Trenton, thirty  
“ miles from Philadelphia, in the month of  
“ October.

“ HOWEVER unoffensive uniform heat, when  
“ agitated by gentle breezes, may be ; there is,  
“ I believe, no record of a dry, warm, and  
“ stagnating air, having existed for any length  
“ of time, without producing diseases. Hip-  
“ pocrates, in describing a pestilential fever,  
“ says, the year in which it prevailed, was with-  
“ out a breeze of wind. The same state of  
“ the atmosphere, for six weeks, is mentioned  
“ in many of the histories of the plague, which  
“ prevailed in London, in 1665.” \*

THUS all the facts stated by Dr. Rush, and  
many of his observations prove, that the yel-  
low fever of Philadelphia, in common with other  
epidemics, was produced by the states or vicissi-

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\* See Rush, pages 109—110.

tudes of the atmosphere, and not by contagious matter, imported, or generated in the city.

PESTILENTIAL diseases are neither so frequent nor so fatal in modern, as they were in ancient times. Cities are now more commodiously built; the mode of living is improved; and every circumstance that can contribute to the preservation of health better understood. Is it not from these changes, in the state of society, that London, Paris, Madrid, Lisbon, and Marseilles, are now much less subject to epidemic diseases than formerly? And in the progress of improvement, may not these diseases entirely disappear? The inhabitants of Grand Cairo, according to Mr. Savary, are heaped together by thousands. Two hundred citizens there occupy less space than thirty at Paris. Thirty citizens of Paris occupy less space than ten citizens of London. Twenty citizens of Grand Cairo, therefore, occupy less space than one citizen of London. The manner in which the citizens of Grand Cairo are thus crowded together, would alone seem sufficient, in a stagnant state of the atmosphere, to produce pestilential diseases of the highest degree.

THE large commercial cities, which have been most frequently ravaged by the plague,



are, for the convenience of sea ports, built in low and unhealthy situations. Their streets have generally been irregular, crowded, and dirty. In these cities, therefore, pestilential diseases always commence. This circumstance, together with that effect of self-love, which prevents us from discovering the origin of any evil with ourselves, probably gave rise to the idea, that contagion was imported in bales of goods, or even in parcels of old clothes, from distant countries. The epidemic of a season, appearing generally in several places at a time, by enabling the inhabitants of one place to trace it to another, has also served to strengthen the same opinion. But may not similar states of the atmosphere occur, in the same season, in Egypt and in Syria, in Damascus and in Aleppo, in Grand Cairo and in Marseilles, in Smyrna and in London, in the West India Islands and in America? And will not these similar states produce pestilential diseases of a similar appearance? The plague, indeed, will never appear with similar symptoms in London and in Constantinople, because the states or vicissitudes of the atmosphere, in these two places, can never be exactly alike. But if it depended upon a power, like specific contagion, which must be

the same in all places, the symptoms would every where appear with an uniformity similar to those of small-pox.

CONTAGION then, it would seem, cannot explain the phenomena of pestilential diseases, without the assistance of the states or vicissitudes of the atmosphere ; but the states or vicissitudes of the atmosphere will explain them, without the assistance of contagion. Here I will again avail myself of the authority of Dr. Rush, as far as importation is concerned. " The report of " the College of Physicians has served to confirm me in an opinion, that the plagues " which desolated most of the countries in Europe in former centuries, and which were " always said to be of foreign extraction, were " in most instances of domestic origin. Between the years 1006 and 1680, the plague " was epidemic 52 times all over Europe. It " prevailed 14 times in the 14th century. The " state of Europe in this long period is well " known. Idleness, a deficiency of vegetable " aliment, a camp life from the frequency of " wars, famine, an uncultivated and marshy " soil, small cabins, and the want of cleanliness " in dress, diet, and furniture, all concurred to

“ generate pestilential diseases. The plagues  
“ which prevailed in London every year, from  
“ 1593 to 1611, and from 1636 to 1649, I  
“ suspect were generated in that city. The  
“ diminution of plagues in Europe, more  
“ especially in London, appears to have been  
“ produced by the great change in the diet and  
“ manners of the people ; also by the more com-  
“ modious and airy forms of the houses of the  
“ poor, among whom the plague *always* makes its  
“ first appearance. It is true these plagues  
“ were said by authors to have been imported,  
“ either directly or indirectly from the Levant ;  
“ but the proofs of such importation were in  
“ most cases as vague and deficient, as they  
“ were of the West India origin of our late  
“ epidemic. The pestilential fevers, which  
“ have been mentioned, have been described by  
[ “ authors, by the generic name of the plague.”\* ]

WHY do pestilential diseases *always* make their first appearance among the poor? Has contagious matter an instinctive attachment to this class of men? No. But they are constantly more exposed than the rich, to the principal power, which produces pestilential diseases, viz.



certain states or certain vicissitudes of the weather.

THE vicissitudes of the atmosphere constitute a power great, evident, and extensive, in its effects upon the animal and vegetable world:—a source, to which the epidemic and pestilential diseases of living bodies may, with certainty, be traced. Whereas contagious matter is a power that has uniformly been taken for granted, without examination; of which the existence, in epidemic and pestilential diseases, is even disproved by a numerous induction of facts; and, if admitted, is incapable of explaining their phenomena.

FROM all these considerations, I conclude that no general disease, excepting such as occur only once during life, is contagious. And that all epidemic and pestilential diseases, which occur more than once during life, and have hitherto been reputed contagious, depend upon certain states, or certain vicissitudes of the atmosphere, together with the application of other powers, producing indirect debility.

VIEWING this as not merely a question of idle medical disputation, but as one of the utmost practical importance, I regret that neither my abilities, nor my situation, enable me to do it that justice, which it certainly deserves. The attempt, which I have made, may however, be the means of calling forth the observations of others, better qualified to illustrate the subject. Whether the existence of contagion, in epidemic and pestilential diseases, be ultimately proved, or disproved, a discussion, and decision of the question must be attended with considerable utility. Let us take a view of the pernicious consequences, which result from the opinion now received, supposing it to be false; and contrast it with the benefits that would arise from a contrary one, supposing it to be true.

THE consternation and mortality, occasioned by epidemic diseases, must always be greatly increased, by a belief in their contagious nature. Those who are yet well, will be the more readily affected; and those who are ill, will be in greater danger of suffering, from the desertion of timid relations, or mercenary attendants. What serious evils may not the dread of contagion produce, among the uninformed multitude, when

it can occasion such scenes as the following, among sensible men of the medical profession? In 1665, we find Dr. Hodges prescribing, from his parlor window, for patients in the streets of London; and at a later period, Dr. P. Russell prescribing from a chamber window, fifteen feet above the level of the streets at Aleppo. Dr. A. Russell's candid account of the manner in which he prescribed, is worthy of note; both as it tends to disprove contagion, and to shew the pernicious consequences of believing in it. "In the two preceeding years" (he wrote in 1744) "I had prescribed for the sick, chiefly from the accounts brought me by a person, whom I employed to visit them; for though before shutting up, I was often, in spite of all my precautions, deceived by false representations of the case, and led to visit some of the infected; yet I avoided it to the utmost of my power: but this year the dread of contagion (like that of other dangers to which one has been long exposed) being much worn off, I attended the sick in the plague in the same manner as those labouring under ordinary fevers." Could Dr. Russell, or his deputy, have attended the sick, with impunity, if the disease had been contagious? In other



words, can a power be applied, without producing its correspondent effect? I know not by what refinement of sophistry, the force of this objection can be eluded. To come down to a period still more recent, some of the physicians of Philadelphia are said to have fled the city, during the prevalence of their late epidemic; a conduct that must have added both to the consternation and mortality of their patients. The effects of a popular belief in such opinions are, in my estimation, no less injurious to mankind, than they are humiliating to the medical profession. What would be said of a military officer, who deserted his post at the sight of an enemy, leaving his fellow soldiers to fight the battle? During the rage of an epidemic, physicians may be looked upon as general officers, in whom it is always regarded more shameful to abandon the field of battle, than in private soldiers.

IF, on the other hand, a belief in contagion was entirely laid aside, the European inhabitants of Aleppo, and other places subject to the plague, would no longer shut themselves up in their houses, for fear of contagion. They would only remain at home occasionally, to avoid

the influence of the sun, or vicissitudes of the weather. Instead of a constant confinement for several months, they would only think it necessary to refrain from going abroad during the hottest part of the day; or to take precautions against the morning and evening fogs. Thus the dread inspired by the apprehensions of infection, would happily be banished from their minds; and that alone would be a powerful mean of protecting them from disease. It is not supposed, however, that the custom of shutting up is useless. The utility of it is evident; and it is as evidently founded upon a principle, very different from that of avoiding contagion. By confinement, the inhabitants of Aleppo avoid exposure to heat, and the vicissitudes of the weather, which are the real source of the plague. But their confinement, if regulated upon principle, need neither be so constant nor so anxious.

ANOTHER advantage that would result from rejecting the doctrine of contagion, in pestilential diseases, is that the quarantines usually exacted of ships, coming from places suspected of contagion, would no longer be considered necessary. The hardship, or rather the cruelty

of such ordeals, is too evident to require a comment. Could the contagion be conveyed in the manner supposed, the injury to individuals must of course be suffered, on account of the community. But if it be proved that this cannot happen, the restriction must appear exceedingly absurd. Is it probable, that London being exempted from pestilential diseases, for many years past, will be imputed to the wonderful strictness, with which Mediterranean ships have been made to perform this forty days farce?

ABOVE all, the adoption of this theory, by recalling physicians from a wrong tract of investigation, would probably be the means of enabling them to apply principles to the cure of all epidemic diseases, hitherto so often fatal, which would render them little more dangerous, than common fevers are at this day.—Instead of wasting time in tracing contagious matter from city to city, they would endeavour to discover what are the particular states or vicissitudes of the atmosphere, which produce epidemic diseases; what are the causes of these vicissitudes; and what are the best modes of counteracting their effects upon the human body.



THIS subject is highly worthy of investigation. For although it may be said that, as the stimulant powers, which are found to cure epidemic diseases, afford a proof that they depend upon a very great degree of indirect debility, and that therefore a minute acquaintance with the powers which occasioned them is not necessary to guide the practice; yet it must also be admitted, that every link, in the chain of knowledge, is a valuable acquisition.—There is not a fact in nature, from which some useful inference may not be drawn.

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#### OBSERVATIONS ON THE CURE.

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WHATEVER be the powers that produce epidemic diseases, it is evident, from those which are found to cure them, that they all depend upon a high state of indirect debility. Fevers and dysentery have of late, every where, yielded to the powers of mercury, and other stimuli of the most diffusible kind. That is, those medi-

cines have been found more successful, than any that were ever used before. If eight grains of calomel, and four grains of opium, repeated every two, three, or four hours, will cure a fever, or a dysentery of a certain degree, will not the same medicines produce the same effect in plague, if given in quantities proportionate to the force of the disease? Ought not the physicians of Aleppo to give a fair trial to a medicine in plague, which has been found so successful in other epidemics? As plague, however, is a disease, by all accounts, of a very high degree of exhaustion, it may sometimes be necessary to go the length of, from fifteen to twenty grains of calomel, or even more, in repeated doses. The duration of the action of each dose, should regulate their repetition; but that does not seem to be yet accurately ascertained. It appears, as far as I have been able to observe, that the intervals, between the doses of mercury, ought not to be longer than two or three hours.—In exhibiting this medicine, it is a fact worthy of remark, and deserves to be particularly remembered when large doses are required, that by a sudden subduction of it, the patient is apt to have a very sore mouth, a violent salivation, and sometimes an alarming discharge of blood from the fauces. When

any of these symptoms unexpectedly occur, it will be found, that the patient has suddenly left off his medicine, or has taken it in such an irregular manner, as to produce similar effects. This will often happen, from the imprudence of patients, in the hands of the most skillful physicians; but it perhaps more frequently occurs, from an ignorance of the fact. Although it has already been noticed in my "Treatise on the Action of Mercury," yet it appears proper to insist upon it, in a more particular manner, when that medicine is proposed to be given in a disease, that will probably require its exhibition in unprecedented quantities. Suppose a case of plague to require the exhibition of a scruple of calomel every two or three hours, if it was suddenly left off, an alarming hemorrhagy would in most cases ensue. It would be of considerable advantage to the practitioner, to know that this effect was produced by the too sudden subduction of the high stimulant power, which had been for some time previously applied to the body; and that it may be prevented by the regular exhibition and gradual reduction; or removed by the re-application of the same power, or the substitution of others equivalent in force. Vicissitudes in the application of substances, used



in medicine, will produce disease, as well as vicissitudes in the state of the atmosphere, or in the force of any other exciting power. But an application of the same powers, in a due degree, will remove the diseases, which an excessive or deficient application, or alternations in the force of them may have occasioned.

THE terms excess and deficiency, in the application of external powers to living bodies, do not relate to the sum of stimulus usually applied in a state of health, but to the state of the excitability at the time.

